

## NATURAL RESOURCES CONSERVATION SERVICE

### CONSERVATION PRACTICE STANDARD

## COVER CROP

(Ac.)

CODE 340

#### DEFINITION

Crops including grasses, legumes and forbs for seasonal cover and other conservation purposes.

#### PURPOSE

The principle purpose of this practice is to provide seasonal protection to erosive sites using annually or biannually seeded species (i.e., clovers) adapted to the site. For establishment of permanent cover, reference the standard Conservation Cover (327).

- Reduce erosion from wind and water
- Increase soil organic matter content.
- Capture and recycle or redistribute nutrients in the soil profile
- Promote biological nitrogen fixation
- Increase biodiversity
- Weed suppression
- Provide supplemental forage
- Soil moisture management
- Reduce particulate emissions into the atmosphere
- Minimize and reduce soil compaction

#### CONDITIONS WHERE PRACTICE APPLIES

On all lands requiring vegetative cover for natural resource protection and/or improvement.

#### CRITERIA

##### General Criteria Applicable to All Purposes

Plant species, seedbed preparation, seeding

rates, seeding dates, seeding depths, fertility requirements and planting methods will be consistent with approved local criteria and site conditions.

Cover crops are not considered nurse crops. Seeding rates shall be at the established rates to provide a full vegetative stand capable of providing the needed erosion protection.

The species selected will be compatible with other components of the cropping system.

Cover crops will be terminated by harvest, frost, mowing, tillage, crimping and/or herbicides in preparation for the following crop.

Herbicides used with cover crops will be compatible with the following crop.

Do not use plants that are on Idaho's noxious weed or invasive species lists.

Cover crop residue will not be burned.

##### Additional Criteria to Reduce Erosion from Wind and Water

The critical erosion period for soil erosion from precipitation and snow melt is December 1 to April 1. The critical erosion period for soil erosion from wind is February 1 to May 1. Cover crops will be seeded during late summer or early fall of the year prior to the critical erosion period when erosion protection is required.

When evaluating this practice as part of a Resource Management System (RMS), the amount of surface and/or canopy cover needed for the cover crop shall be determined using current erosion prediction technology.

Cover crop establishment, in conjunction with other practices, will be timed so that the soil

will be adequately protected during the critical erosion period(s).

Plants selected for cover crops will have the physical characteristics necessary to provide adequate protection.

#### **Additional Criteria to Increase Soil Organic Matter Content**

Cover crop species will be selected on the basis of producing high volumes of organic material and/or root mass to protect the soil surface and to maintain or improve soil organic matter.

The NRCS Soil Conditioning Index (SCI) procedure will be used to determine the amount of biomass required to have a positive trend in the soil organic matter subfactor.

The cover crop will be terminated as late as feasible to maximize plant biomass production, considering the time needed to prepare the field for planting the next crop and soil moisture depletion.

#### **Additional Criteria to Capture and Recycle Excess Nutrients in the Soil Profile**

Cover crops will be established and actively growing before the expected period(s) of nutrient leaching.

Cover crop species will be selected for their ability to take up large amounts of nutrients from the rooting profile of the soil.

#### **Additional Criteria to Promote Biological Nitrogen Fixation**

Legumes or legume-grass mixtures will be established as cover crops when soil nitrogen improvement is the primary objective.

The specific Rhizobium bacteria for the selected legume will either be present in the soil or the seed will be inoculated at the time of planting.

#### **Additional Criteria to Increase Biodiversity**

Cover crop species shall be selected that have different maturity dates, attract beneficial insects, increase soil biological diversity, serve as a trap crop for damaging insects and/or provide food and cover for wildlife habitat management.

#### **Additional Criteria for Weed Suppression**

Species for the cover crop will be selected for their chemical or physical characteristics to suppress or compete with weeds.

Cover crop residues will be left on the soil surface to maximize allelopathic (chemical) and mulching (physical) effects.

For long-term weed suppression, reseeding annuals and/or biennial species can be used.

#### **Additional Criteria to Provide Supplemental Forage**

Species selected will have desired forage traits, be palatable to livestock and not interfere with the production of the subsequent crop.

Forage provided by the cover crop may be hayed or grazed as long as sufficient biomass is left for resource protection.

#### **Additional Criteria for Soil Moisture Management**

Terminate growth of the cover crop sufficiently early to conserve soil moisture for the subsequent crop. Cover crops established for moisture conservation shall be left on the soil surface.

In areas of potential excess soil moisture, allow the cover crop to grow as long as possible to maximize soil moisture removal.

#### **Additional Criteria to Reduce Particulate Emissions into the Atmosphere**

Manage cover crops and their residues so that at least 80% ground cover is maintained during planting operations for the following crop.

#### **Additional Criteria to Minimize and Reduce Soil Compaction**

Select and manage cover crop species that will produce deep roots and large amounts of surface or root biomass to increase soil organic matter, improve soil structure and increase soil moisture through better infiltration.

#### **CONSIDERATIONS**

When used to redistribute nutrients from deeper in the profile to the surface layer, the cover crop will be killed in relation to the

planting date of the following crop. If the objective is to best synchronize the use of the cover crop as a green manure to cycle nutrients, factors such as the carbon/nitrogen ratios may be considered to kill early, and have a faster mineralization of nutrients to match release of nutrients with uptake by the following crop. A late kill may be used if the objectives are to use as a biological control and maximize the addition of organic matter. The correct time to kill the cover crop will depend on the specific rotation, weather and objectives.

Plant the cover crop in a timely manner to enhance the establishment of a good stand.

Maintain an actively growing cover crop as late as feasible to maximize plant growth, allowing time to prepare the field for the next crop and moisture depletion.

Use deep-rooted species to maximize nutrient recovery.

Use grasses to utilize more soil nitrogen, and legumes to utilize both nitrogen and phosphorus.

Avoid cover crop species that harbor or carryover potentially damaging diseases or insects.

For most purposes for which cover crops are established, the combined canopy and surface cover is nearly 90 percent or greater, and the above ground (dry weight) biomass production is at least 4,000 lbs/acre.

Cover crops may be used to improve site conditions for the establishment of perennial species.

Use plant species that enhance bio-fuels opportunities.

Use plant species that enhance forage opportunities for pollinators.

## PLANS AND SPECIFICATIONS

Plans and specifications will be prepared for the practice site. Plans for the establishment of cover crops shall include:

- Specie or species of plants to be established
- Seeding rates

- Recommended seeding dates
- Establishment procedure
- Planned rates and timing of nutrient application
- Planned dates for destroying cover crop
- Other information pertinent to establishing and managing the cover crop

Plans and specifications for the establishment and management of cover crops may be recorded in narrative form, on job sheets or on other forms.

## OPERATION AND MAINTENANCE

Control growth of the cover crop to reduce competition from volunteer plants and shading.

Control weeds in cover crops by mowing or by using other pest management techniques.

Control soil moisture depletion by selecting water efficient plant species and terminating the cover crop before excessive transpiration.

## REFERENCES

Bowman, G., C. Cramer, and C. Shirley. A. Clark (ed.). 1998. Managing cover crops profitably. 2nd ed. Sustainable Agriculture Network Handbook Series; bk 3. National Agriculture Library. Beltsville, MD.

Hargrove, W.L., ed. Cover crops for clean water. SWCS, 1991.

Magdoff, F. and H. van Es. Cover Crops. 2000. p. 87-96. In *Building soils for better crops*. 2nd ed. Sustainable Agriculture Network Handbook Series; bk 4. National Agriculture Library. Beltsville, MD.

Reeves, D.W. 1994. Cover crops and erosion. p. 125-172. In *Crops Residue Management*, J.L. Hatfield and B.A. Stewart (eds.) CRC Press, Boca Raton, FL.

